FROM NATURE FOR LIFE
IMPROVING LIVES BY DEVELOPING RESOURCES SUSTAINABLY
Foreword

For many of the products we use on a daily basis, we know very little about the processes involved in producing them. This booklet helps describe how pulp is sustainably produced and made into products used in our daily lives. It also describes how palm oil is processed into a wide variety of products many of which end up being served on our dining tables each day.

A variety of complex processes are used to produce these products, taking advantage of modern technology, world-class research and development, well-trained human resources, sustainable practices, and partnerships with the surrounding communities.

In developing these processes at the core of their business, the founders of Tanoto Foundation, Mr. Sukanto Tanoto and Mrs. Tinah Bingei Tanoto, have become champions for sustainable natural resource development. This booklet can help those who care about Indonesia’s natural resources understand more about sustainable production in Pangkalan Kerinci.

Happy reading.

01 February 2019

Dr. J. Satrijo Tanudjojo
CEO Global Tanoto Foundation
The products we use everyday...

From comfortable soft clothing...

Shampoo...

Tissue paper...

Drink containers...

Printing paper...

To cooking oil.

Do you know how all these products are made?

Let's take a quick flight to Pangkalan Kerinci town site in Sumatra.

To learn how the natural resources are processed and converted into products that are useful for the human lives.
Indonesia is blessed with natural resources...

Fertile land, the sun that shines all year long, and a favorable climate.

Indonesia’s earth is highly suited for cultivating industrial tree crops.

Through an environmentally sustainable process...

Fiber from plantations gets converted into...

Paper...

Tissue paper...

Containers...

Even fashion products
The main ingredient of paper is acacia wood (Acacia crassicarpa) and eucalyptus (Eucalyptus sp.).

There are two ways to breed the seeds of these trees...

...generative and vegetative.

Generative breeding is carried out in a tissue culture laboratory to produce seeds with the same quality as the mother plant.

In this laboratory, scientists also conduct research and development of acacia and eucalyptus seeds of superior quality that maximize plant productivity.
The seeds from the laboratory are then transferred to a nursery for replication. In the nursery, vegetative breeding is also done using a cutting technique, where the leaves of the mother plant are cut off and planted in a cocopeat media. The resulting seedlings are treated with modern technology, such as automatic watering and fertilization. After 9-10 weeks, the seedlings are ready to be planted on the company's concession land.
These central and satellite nurseries, produce 200 million acacia and eucalyptus seedlings each year. This process provides employment opportunities for local communities.
500,000 acacia and eucalyptus trees are planted every day. It is the equivalent of 150 million trees per year.

Of the one million hectares of concession area in Pangkalan Kerinci, 480,000 hectares are used for plantation, the rest are reserved for conservation, community, and infrastructure development.

Comparison of harvest time in Indonesia with other countries.

- In Indonesia: 5-6 years
- In Other Countries: 20-60 years

Rapid tree growth is a competitive advantage for Indonesia.
Trees are harvested after they are 5-6 years old and the replanting process starts immediately.

Harvested trunks are then transported to the mill...

To be processed into pulp.
Log from the woodyard moves into the debarker to remove the bark.

Processed in a digester to be crushed at high temperatures and pressures that produce fiber/pulp and lignin/black liquor.

The pulp is transferred to the blow tank for the cleaning and drying processes.

Processed in a chipper to be chopped into small pieces.

Black liquor is processed in the evaporator and then transferred to the recovery boiler that drives a turbine in a power plant providing electricity to all mill areas.

This is the pulp produced from acacia and eucalyptus tree.

A byproduct of recovery boiler is a white liquor that can be reprocessed into pulp in the digester. All of these processes repeatedly become an efficient cycle.

The pulp is dried and printed in sheet form...

In the downstream industry...

A pulp mill process

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The pulp is processed into derivative products, including fashion wear.
1. Solid pulp diluted in the refinery
2. Filtering process to get uniform fiber dimensions to be distributed on sheet-forming machines.
3. Processing in the head box, where water is added to prevent clumping.
4. Processing into a sheet of paper
5. Forming paper sheets and drying.
6. Rolling of paper in large rolls.
7. Paper cutting and packaging so that it is ready for market.
8. All of these activities are run from the control room by expert staff trained to operate automated processes.
Pulp can also be converted into rayon fiber (viscose) for use as a clothing material.

The initial process is the same as paper making...

But the final product is a filament that can be spun into yarn.

Yarn spun from rayon fibers is woven into fabric.

Rayon fiber fabrics are used as material for various fashion products.

Rayon fiber can be blended well with other materials to become good quality fabric.

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Rayon fiber fabric has several advantages, namely that it is soft and smooth, not easy wrinkled, glows naturally and is good at absorbing water/sweat.
Technology enables raw materials from forestry to be converted into fashion products.

Viscose also supports the preservation of indigenous Indonesian cultural heritage, namely batik.

The process converting wood to viscose is 100% Indonesian. This full vertical integration is helping Indonesia realize the dream of an independently controlled fashion industry.

- Reduce viscose imports (Indonesian imports were US $149 million in 2017).
- Support foreign exchange earnings through viscose exports (US $216 million/year).
The mill at Pangkalan Kerinci, Riau is a world-class pulp and paper producer.

Future experts in pulp and paper are trained through the Diploma 3 Pulp and Paper program at Riau University, which is the only education program of its kind in Indonesia registered with the Ministry of Research, Technology and Higher Education.

In an effort to support the sustainability of the industry, the best human resources are required to improve the quality and productivity of pulp and paper.

This program is equipped with pulp and paper research laboratory facilities directly connected to industry practices and lecturers experienced as practitioners.
Facts of the pulp and paper Mill at Pangkalan Kerinci

One of the most efficient pulp and paper mills in the world.

Converts waste from pulp and paper processing into electricity equivalent to 390 megawatts per year. 2% (10 megawatts) of the electricity is distributed to residents of Pangkalan Kerinci and the local state power plant.

Processes wood harvested sustainably.

Recycles 90% of water used by the mill.

85% of the energy used comes from renewable sources.
Riau Ecosystem Restoration (RER)

Riau Ecosystem Restoration is a project to restore and conserve an area of ecologically important peat forest in Indonesia's Sumatra Island. This project began in May 2013 with 20,265 hectares and expanded to more than 150,000 hectares in 2015.

A four-phase approach is employed to restore and conserve:
- Protect landscapes and natural resources from degradation
- Assess the ecosystem and the social environment
- Restore the hydrology, native plants and wildlife species
- Manage the area in the long term to maintain biodiversity and people's lives
OIL PALM FACTS:

- Oil palm is suitable to be cultivated in tropical climates such as Indonesia.
- The productive age of oil palm trees is 25 years, afterwards they need to be regenerated.
- Each palm oil fruit contains 30-35% oil. Each oil palm produces 40 kg of oil every year.
- Productive oil palms can be harvested in every 10 days.

EFFICIENCY OF OIL-PRODUCING CROP LAND

(Source: Oil World (2018), Oil World Statistic Ista Mielke GmbH Hamburg)

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<tr>
<td>Palm Oil</td>
<td>4.27</td>
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<tr>
<td>Rapeseed Oil</td>
<td>0.69</td>
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<tr>
<td>Sunflower Oil</td>
<td>0.52</td>
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<tr>
<td>Soybean Oil</td>
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The palm oil industry employs 16.2 million workers in Indonesia. (Source: Bappenas 2018)

62% of the world’s total vegetable oil is palm oil produced by Indonesia and Malaysia. (Source: Oil World 2015)
Productive palm oil trees with maximum yields obtained from superior seeds.

The plantation is equipped with modern laboratory facilities for palm oil breeding called the Topaz Oil Palm Research Station.

In the Topaz Oil Palm Research Station, 21 expert researchers have succeeded in cultivating superior oil palm seeds derived from a combination of seed types from various countries.

Production capacity at the OPRS is 25 million germination seeds per year, making it one of the largest sellers of oil palm seeds in Indonesia.
PLANTING AND MAINTENANCE OF OIL PALM TREES...

CARRIED OUT BY PROMOTING THE PRINCIPLES OF SUSTAINABILITY

EMPTY FRUIT BUNCHES ARE USED FOR NATURAL FERTILIZER.

RAT PEST CONTROL USES OWLS AS NATURAL PREDATORS

TURNERA SUBULATA PLANTS ARE USED TO CONTROL CATERPILLAR PESTS THAT ATTACK THE LEAVES OF THE OIL PALM.

LOCAL HOUSEWIVES IN THE SURROUNDING AREA ARE EMPowered TO EARN ADDITIONAL INCOME.
Oil palm generally starts to be harvested after 3-4 years.

Oil palm from Topaz seeds can be harvested after they are 2.5 years old.

The palm oil can be harvested if 10 fruits have fallen from the bunch.

Fresh fruit bunches are directly transported from the plantation.

THE OIL PALM FRUIT

EXOCARP

MESOCARP
PROCESSED TO BECOME CRUDE PALM OIL

EXOCARP/KERNEL
PROCESSED TO BECOME COSMETICS

ENDOCARP

THE OIL PALM FRUIT

TO BE PROCESSED INTO CRUDE PALM OIL (CPO)
1. Fruit is sorted by its maturity and quality.
2. The splitter punches holes in the oil palm fruit to reduce the boiling time and to ensure the fruit is boiled evenly.
3. The palm fruit is boiled in a giant tube to stop the growth of free fatty acids.
4. Loose fruit are separated from the bunches by threshing.
5. Pressing extracts oil from the fruit.
6. Crude palm oil (CPO) is purified and distributed through pipes.
7. CPO is ready to be marketed.
8. All processes make use of sophisticated automation technology to produce quality CPO from superior seeds.

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<th>The stages of processing fresh fruit bunches into CPO</th>
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CPO is a versatile vegetable oil that can be processed into various products, ranging from food to daily necessities and industrial products.

Through further processing, CPO can be converted into ingredients for cooking oil, margarine, white butter, ice cream, noodles, chocolate, confectionery, soap, detergent, shampoo, fabric softener, lubricant, and much more.
Oil palm plantations are also a solution to the depletion of fossil fuels as biofuels can be used as renewable energy.

Empty bunches, shells, fruit fibers, trunks, and midribs can be processed into biomass and used as an ethanol base material.

Palm Oil Mill Effluent (POME) can be processed into biogas/bio methane.

CPO is converted into biodiesel for use as vehicle fuel.
Partnerships with local farmers are very important. A One to One Commitment Program is applied where each hectare of sourcing from company plantations is matched with equivalent sourcing from smallholder farmers.

**Partnership Scheme**

- Help smallholder partners improve productivity through modern farming methods.
- Better equipment, training, and assistance in the plantation.
The sustainability of the palm oil industry, especially in developing reliable human resources in the plantation sector and increasing the quality and productivity of palm oil is very important.

Every year, around 100 top graduate students from various universities in Indonesia are given the opportunity to receive training.

The students will be trained, not only in best practice oil palm plantation management, but also in character building and soft skills.
Caring for Communities

Today, the company has partnered with more than 150 villages.

Improving public access to health services is improved through various support activities, including the provision of nutrition for mothers and children through integrated health posts (posyandu) and campaigns for clean and healthy living in schools.

Improving access to public education through scholarship programs ranging from elementary to secondary levels, as well as vocational scholarships in agriculture and pulp and paper.

Infrastructure development for communities is also important, including the construction of roads, houses of worship, schools, sanitation, clean water, and electricity.

Working closely with village cooperatives to improve the welfare of independent smallholders farmers, including by providing guidance and training to improve crop yields, and support ISPO* and RSPO** certification.

* Indonesian Sustainable Palm Oil
** Roundtable On Sustainable Palm Oil
Developing integrated farming systems to improve skills in agricultural activities, such as horticulture, plantation management, livestock rearing, and aquaculture.

Supporting the development of small and medium enterprises for the community. SME programs are targeted to businesses that connect to company operations, as well as businesses that are not related to the company.
The fire free village program is an initiative to invite the public to care about the impacts of forest and land fires. The program began in 2015 by giving awards to participating villages that successfully implemented the program. Increasing public awareness of the dangers of land fires by carrying out various assistance programs in agriculture... Including the provision of tree seedlings, facilities and infrastructure such as the provision of tractors and education on alternative methods of land clearing. The program also presents an integrated smoke haze monitoring system, based on data obtained in the field and the use of modern equipment.
TANOTO FOUNDATION

OUR CORE BELIEF
Quality Education Accelerates Equal Opportunity

OUR MISSION
We harness the transformative power of education to realize people’s full potential and to improve lives

OUR CONVICTIONS
- Realize People’s Full Potential
- Enhance Communities
- Improve Lives
- Leverage Partnerships

OUR COMMITMENTS
- Improving human capital through learning environments
- Building and empowering future leaders to accelerate positive change for communities
- Advancing medical research and sciences for healthier lives

SIGAP
Strengthening Indonesia’s Early Generation by Accelerating Potential

PINTAR
Promoting Improvement to Innovate, Teach and Reach

TELADAN
Teaching Leadership, Advancing The Nation

OUR INTENT
- Significantly reduce stunting in Indonesia
- Elevate Indonesia’s global ranking in education
- Accelerate discovery and application of Asia-relevant medical interventions
- Create strong leaders
Every person should have the opportunity to realize his or her full potential.

-Sukanto Tanoto and Tinah Bingei Tanoto-
Did you know how the useful items in our daily lives, such as paper, tissue, clothing, cooking oil, butter, and biodiesel are produced?

These items are processed by developing Indonesia’s natural resources leveraging competitive advantages that other countries do not have. Modern, complex and interesting processes lie behind the making of these products.

By reading this book, you will:

- Learn the process of making pulp and its derivative products.
- Learn the process of making crude palm oil and its derivative products.
- Best practices in pulp and crude palm oil production that are sustainable and in line with the needs of nature and the surrounding community.